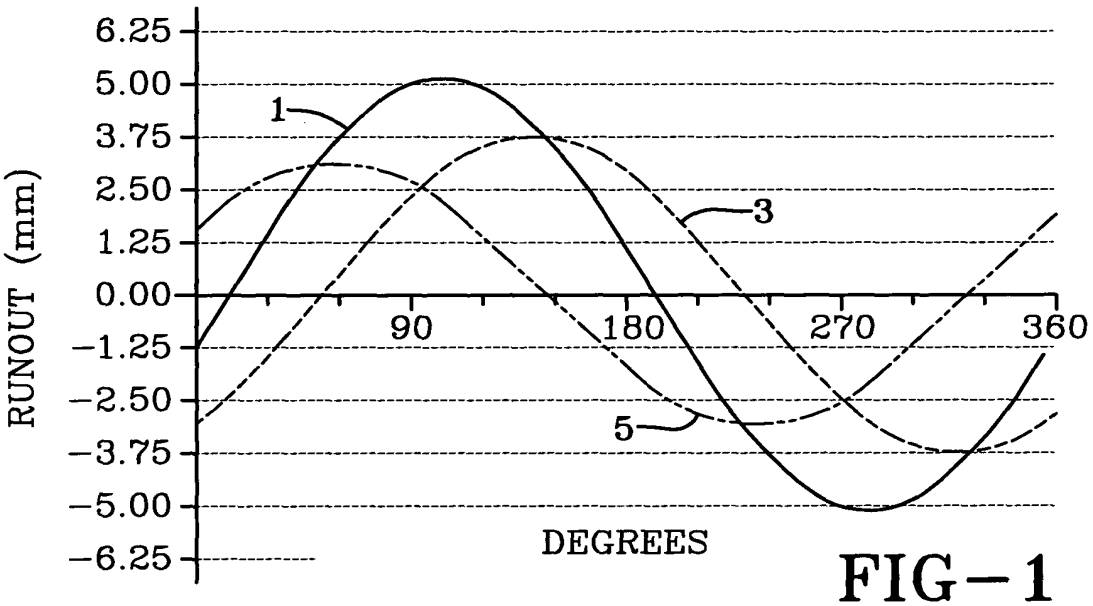
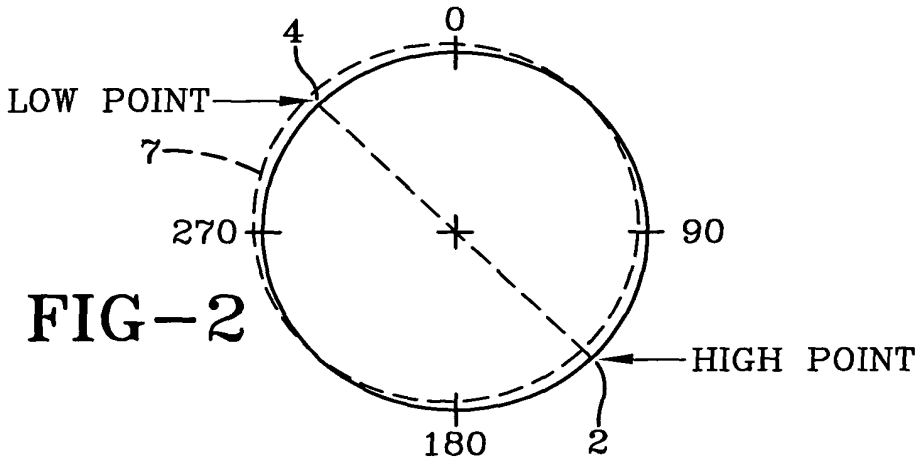
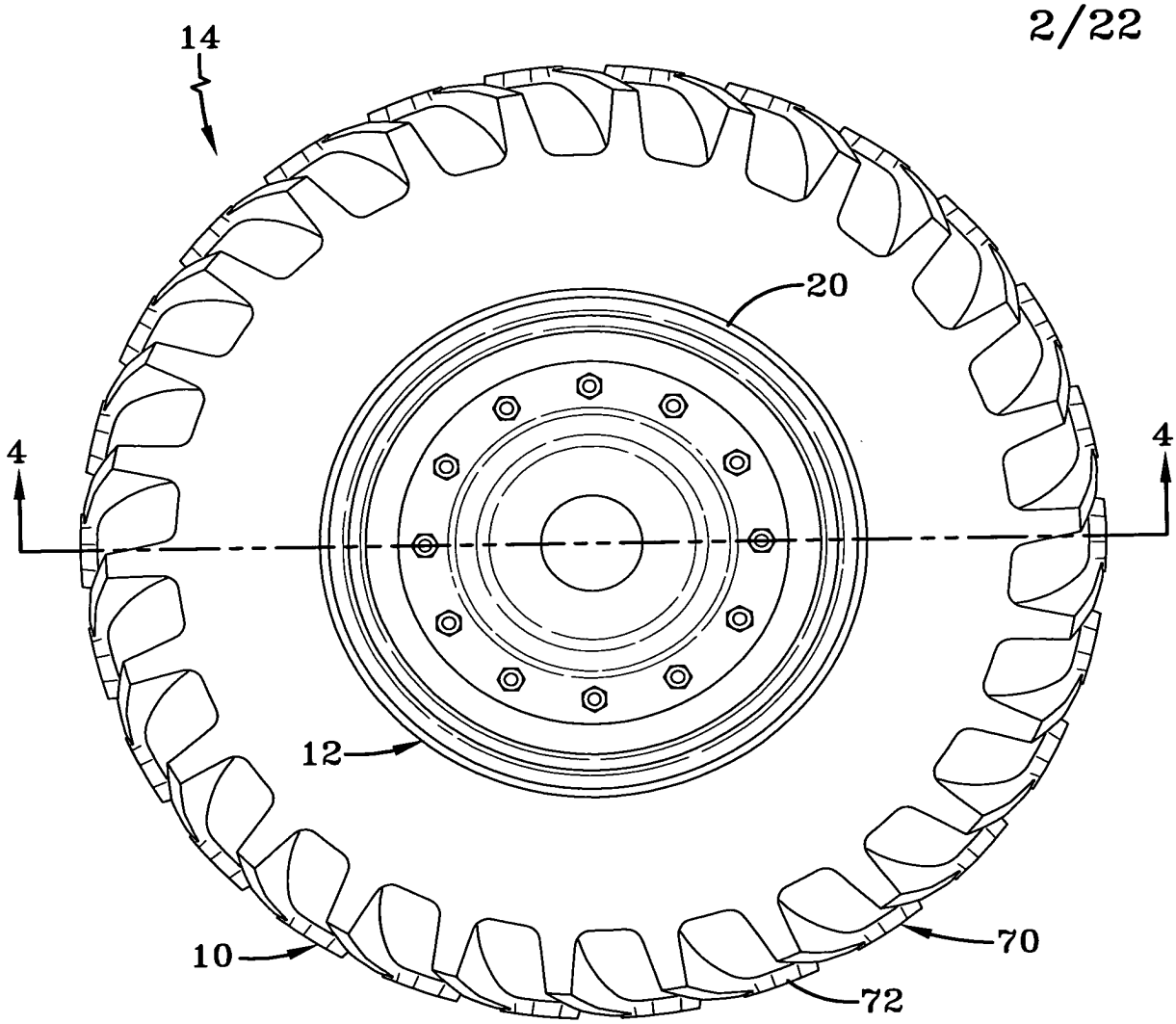

6.25
5.00
3.75
2.50
1.25
0.00
−1.25
−2.50
−3.75
−5.00
−6.25
RUNOUT (mm)
90
180
270
360
DEGREES
1
3
5

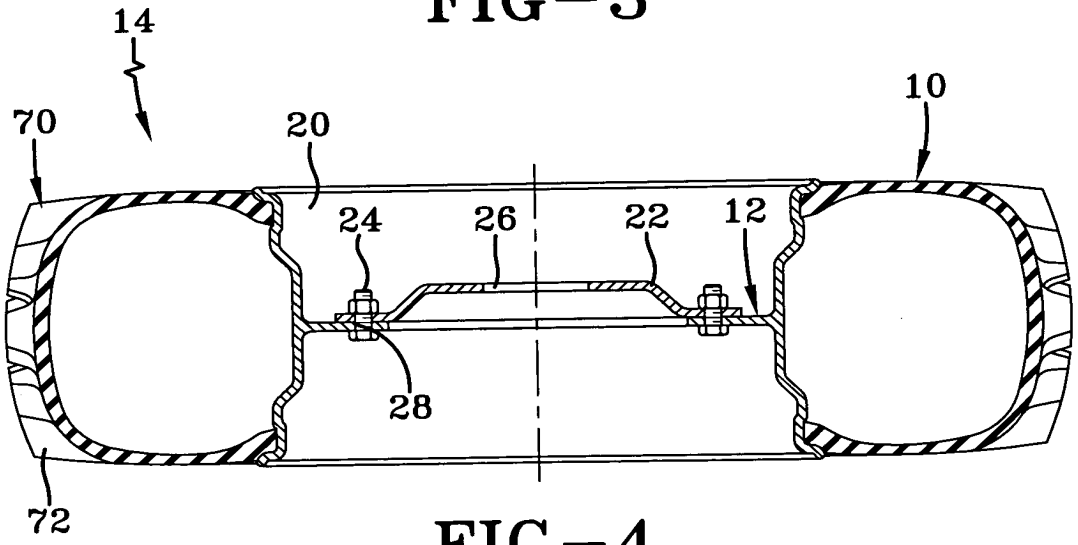
FIG−1


0
4
LOW POINT
7
270
90
HIGH POINT
180
2

FIG−2



FIG–3



FIG–4

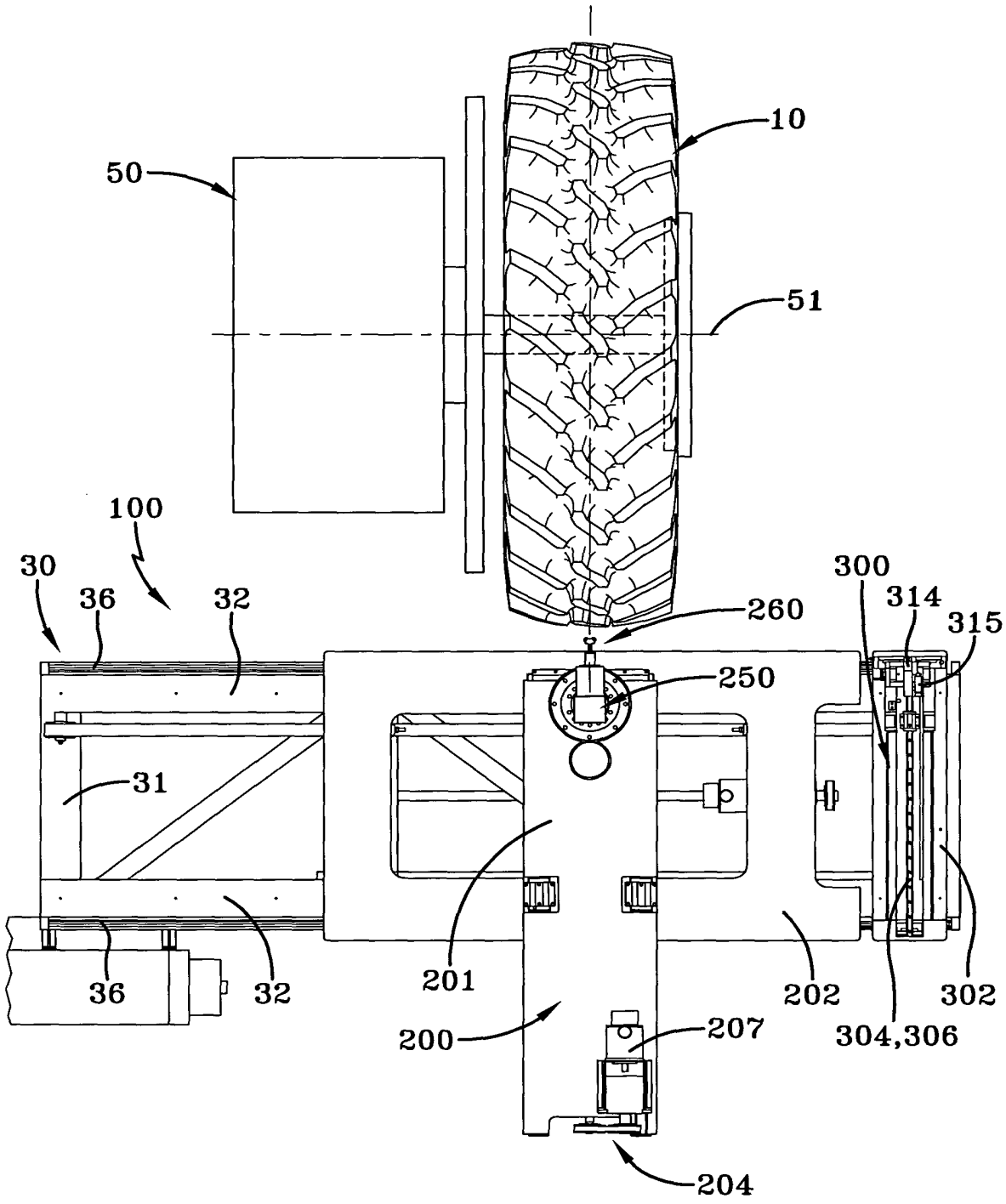

10
50
51
100
30
36
32
260
300
314
315
250
31
201
202
302
36
32
200
207
304,306
204

FIG-5

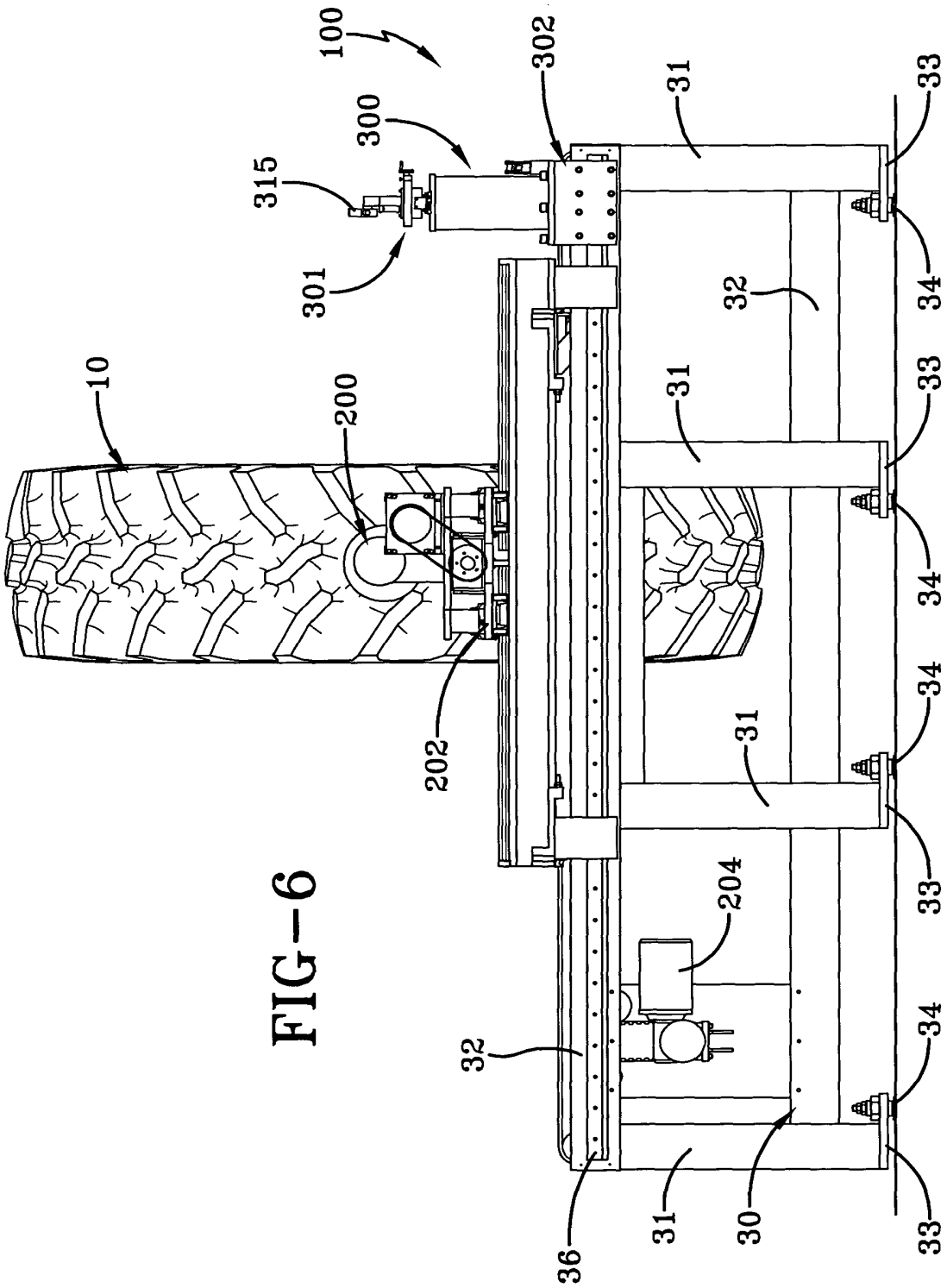

100
302
31
33
300
315
34
301
32
10
200
31
33
34
202
34
31
33
204
32
34
36
31
30
33

FIG-6

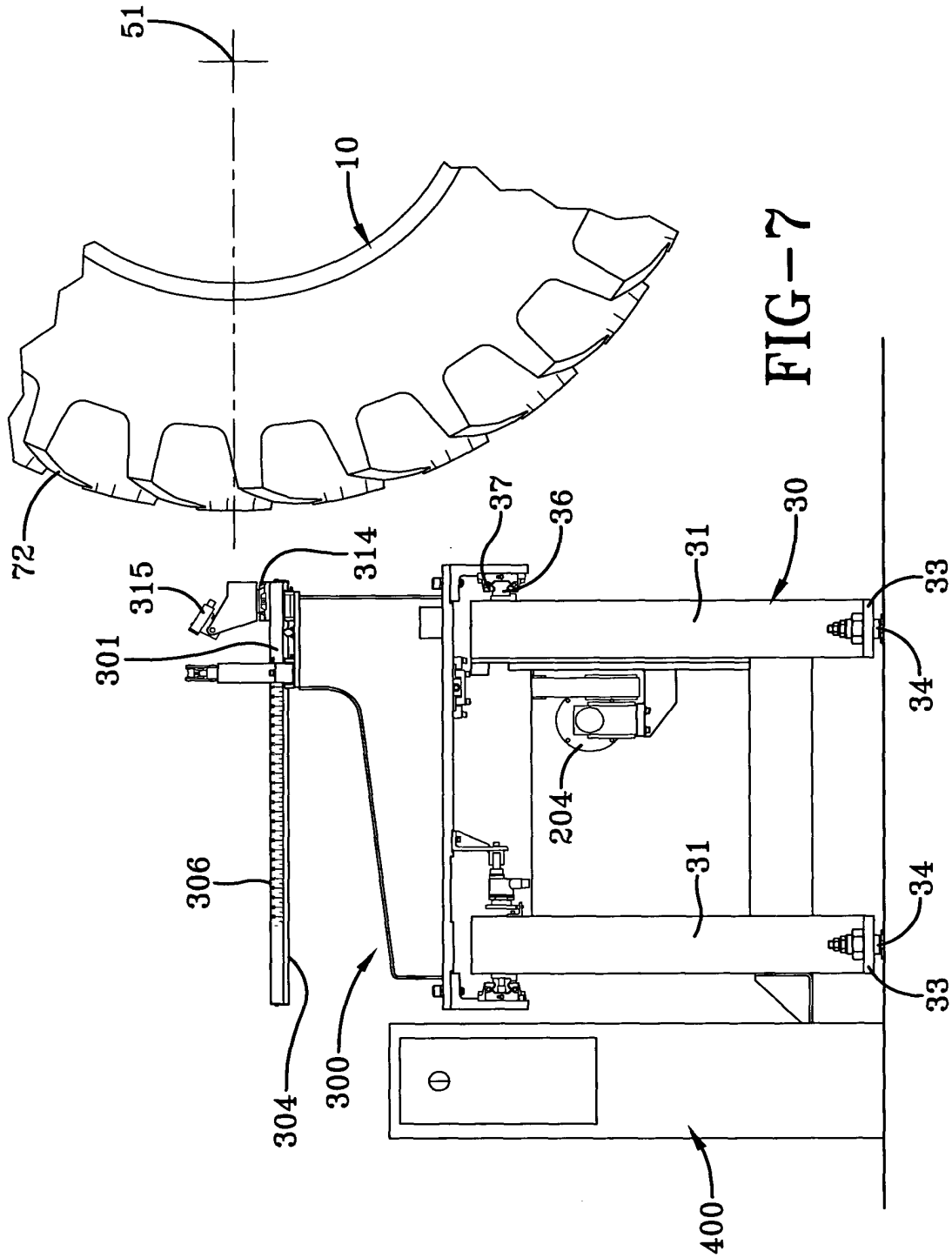


FIG-7

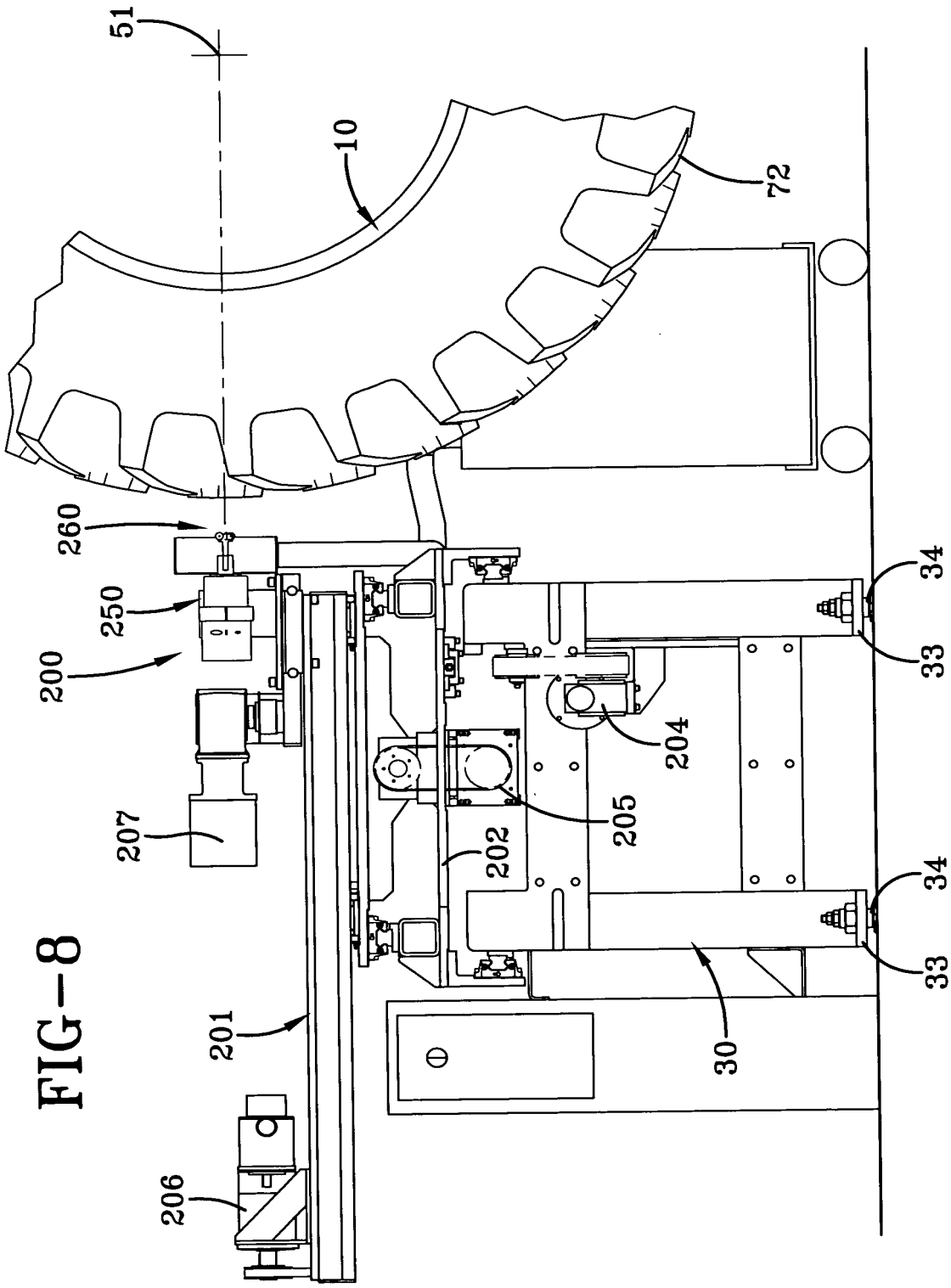


FIG-8

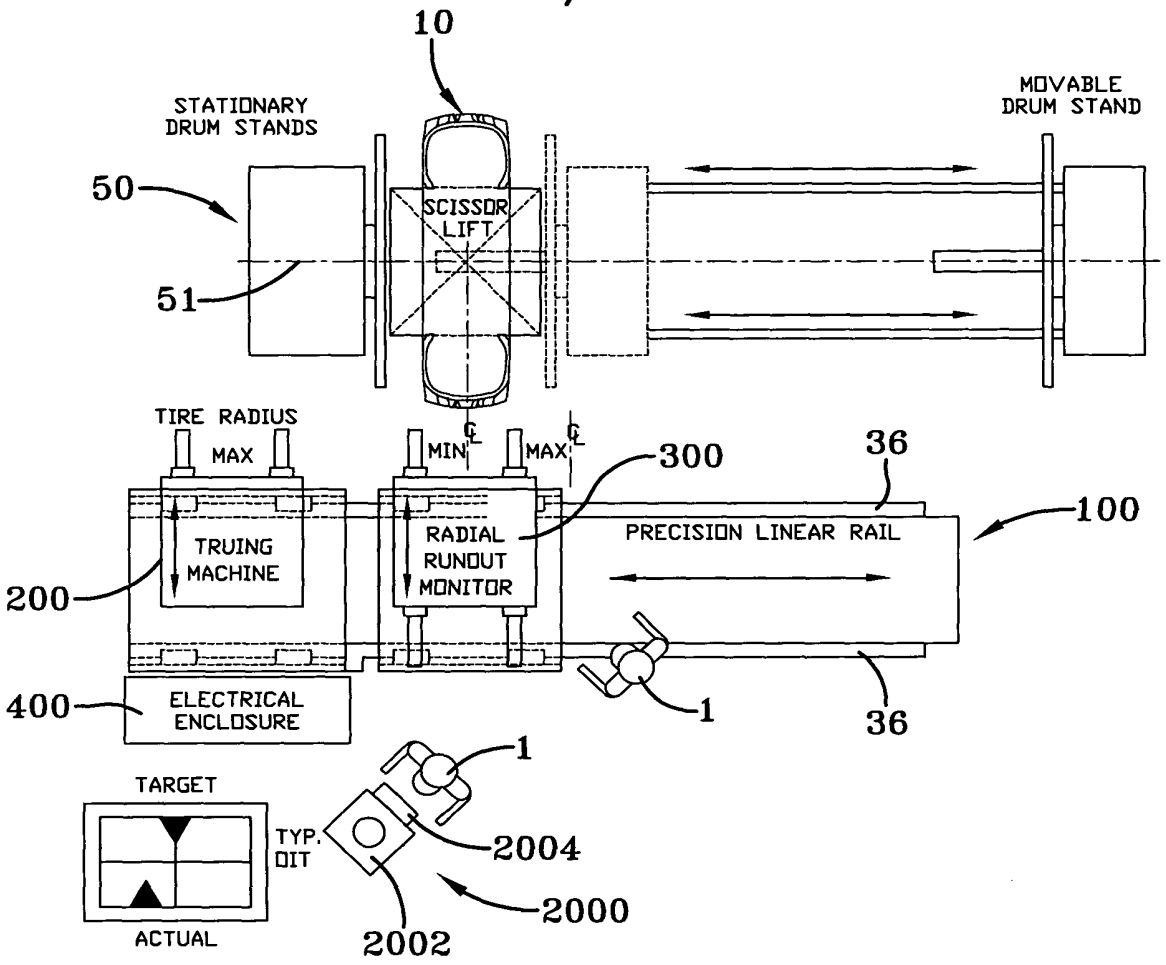

10
STATIONARY DRUM STANDS
MOVABLE DRUM STAND
50
51
SCISSOR LIFT
TIRE RADIUS
MAX
MIN
MAX
300
36
100
TRUING MACHINE
RADIAL RUNOUT MONITOR
PRECISION LINEAR RAIL
200
400
ELECTRICAL ENCLOSURE
1
36
TARGET
TYP. DIT
ACTUAL
1
2004
2000
2002

FIG-9

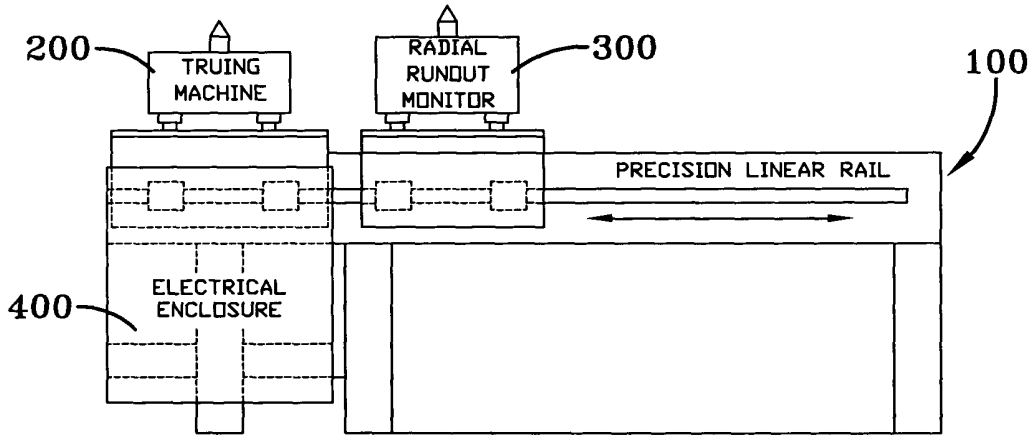

200
TRUING MACHINE
RADIAL RUNOUT MONITOR
300
100
PRECISION LINEAR RAIL
400
ELECTRICAL ENCLOSURE

FIG-10

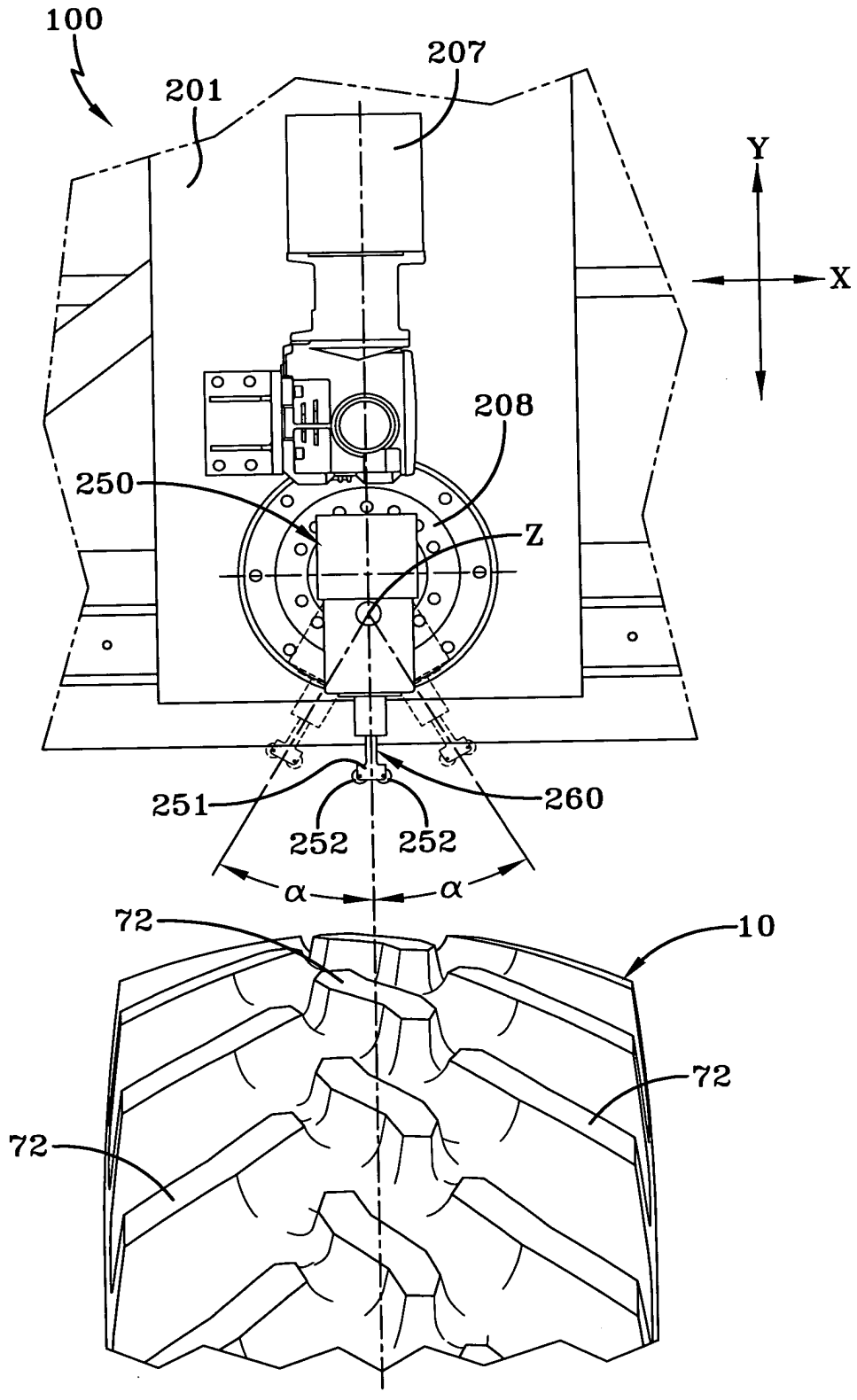


FIG-11

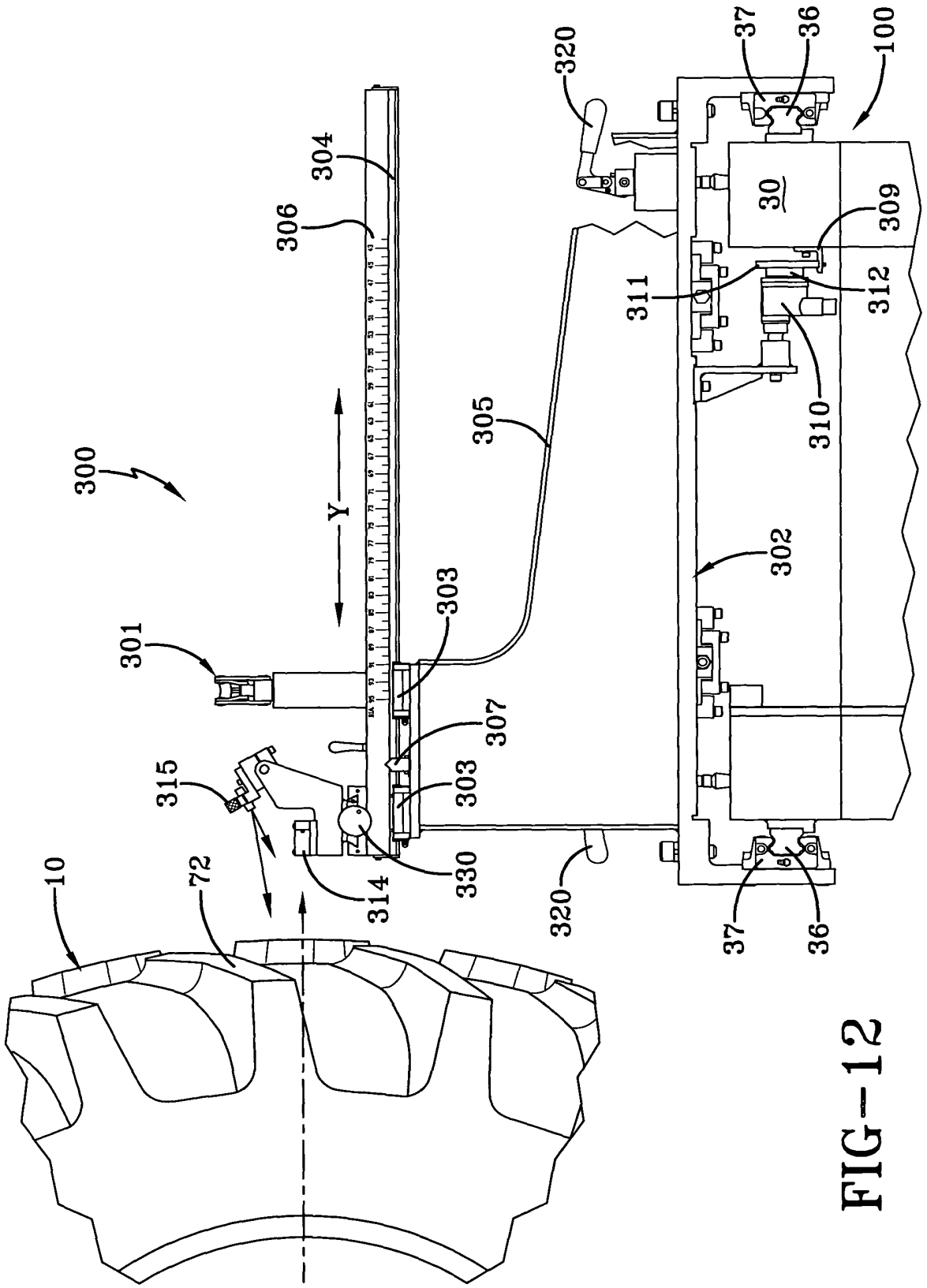

300
301
303
304
305
306
307
309
310
311
312
314
315
320
330
Y
10
72
30
302
100
36
37

FIG-12

FIG-13A

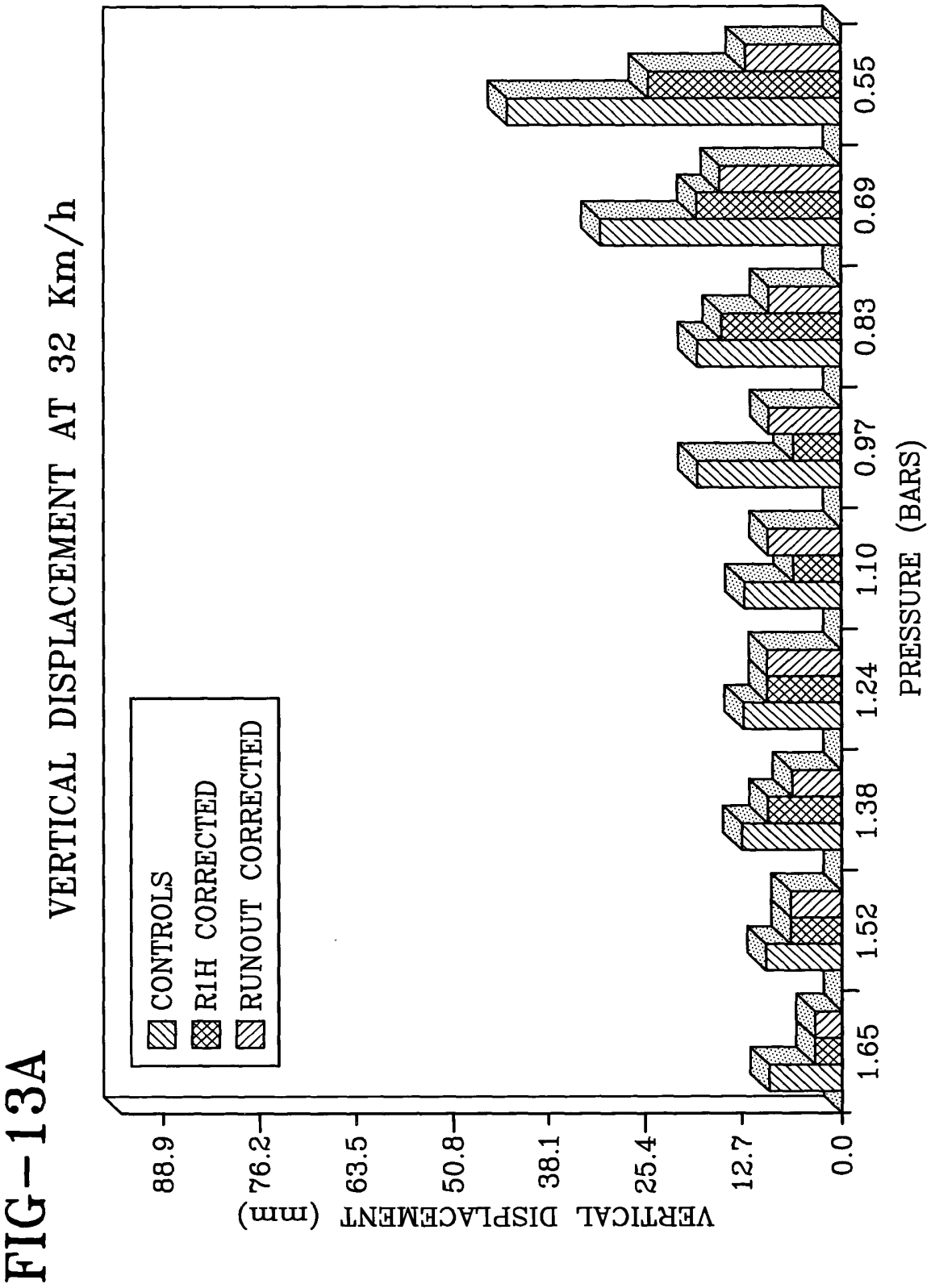

VERTICAL DISPLACEMENT AT 32 Km/h
CONTROLS
R1H CORRECTED
RUNOUT CORRECTED
VERTICAL DISPLACEMENT (mm)
88.9
76.2
63.5
50.8
38.1
25.4
12.7
0.0
1.65
1.52
1.38
1.24
1.10
0.97
0.83
0.69
0.55
PRESSURE (BARS)

FIG-13B

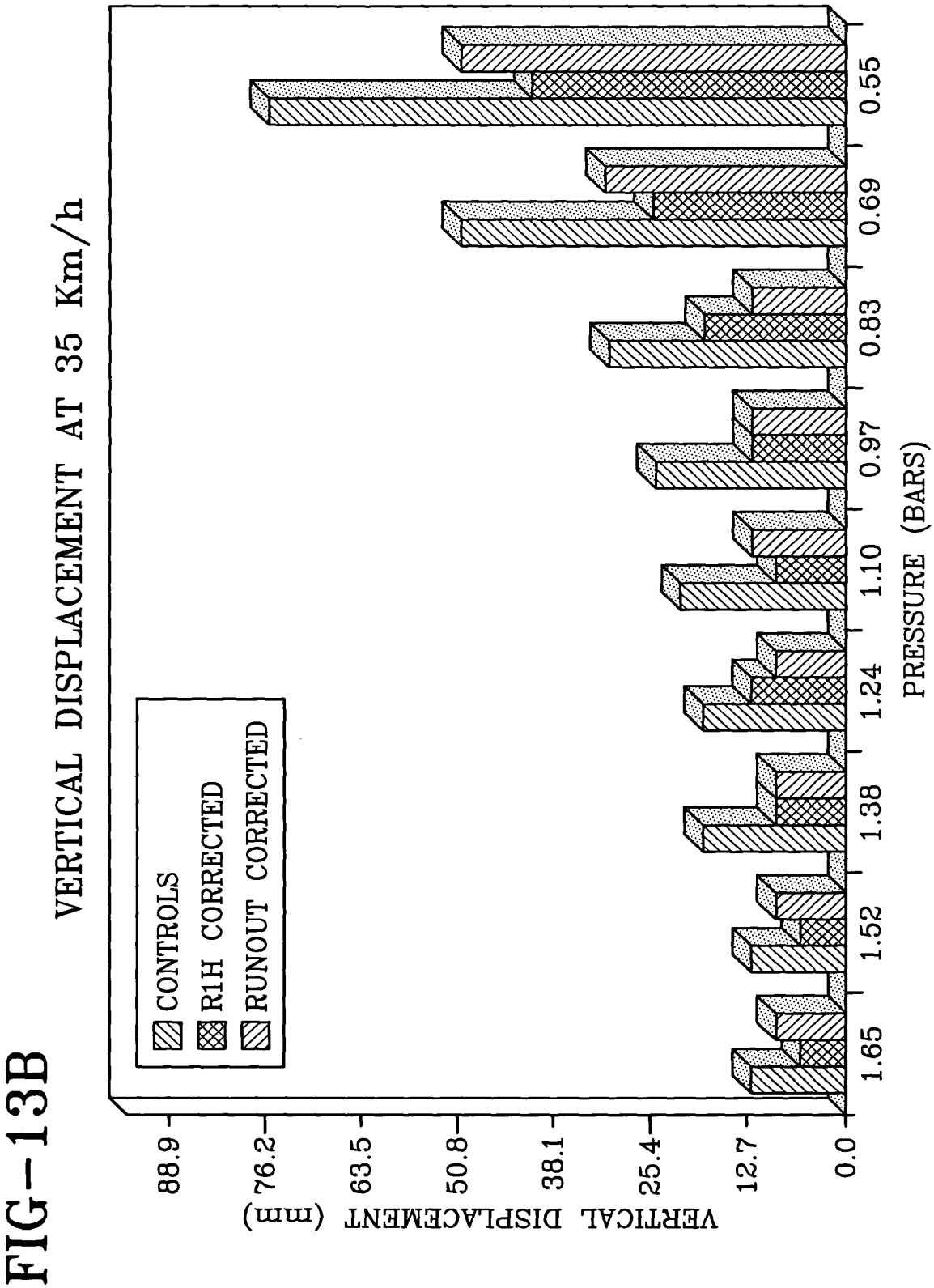
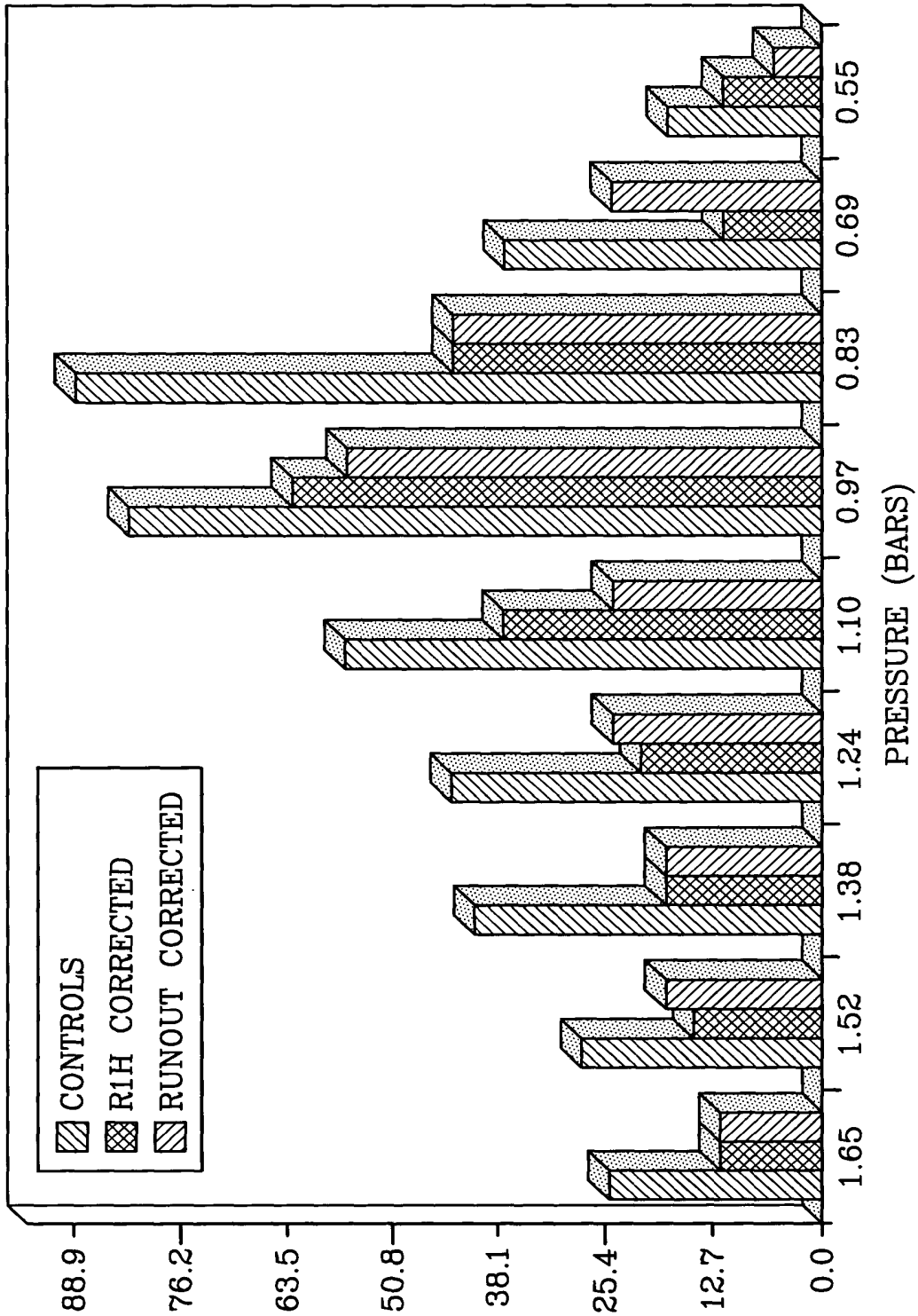

VERTICAL DISPLACEMENT AT 35 Km/h
CONTROLS
R1H CORRECTED
RUNOUT CORRECTED
VERTICAL DISPLACEMENT (mm)
88.9
76.2
63.5
50.8
38.1
25.4
12.7
0.0
1.65
1.52
1.38
1.24
1.10
0.97
0.83
0.69
0.55
PRESSURE (BARS)

FIG-13C


VERTICAL DISPLACEMENT AT 42 Km/h
CONTROLS
R1H CORRECTED
RUNOUT CORRECTED
VERTICAL DISPLACEMENT (mm)
88.9
76.2
63.5
50.8
38.1
25.4
12.7
0.0
1.65
1.52
1.38
1.24
1.10
0.97
0.83
0.69
0.55
PRESSURE (BARS)

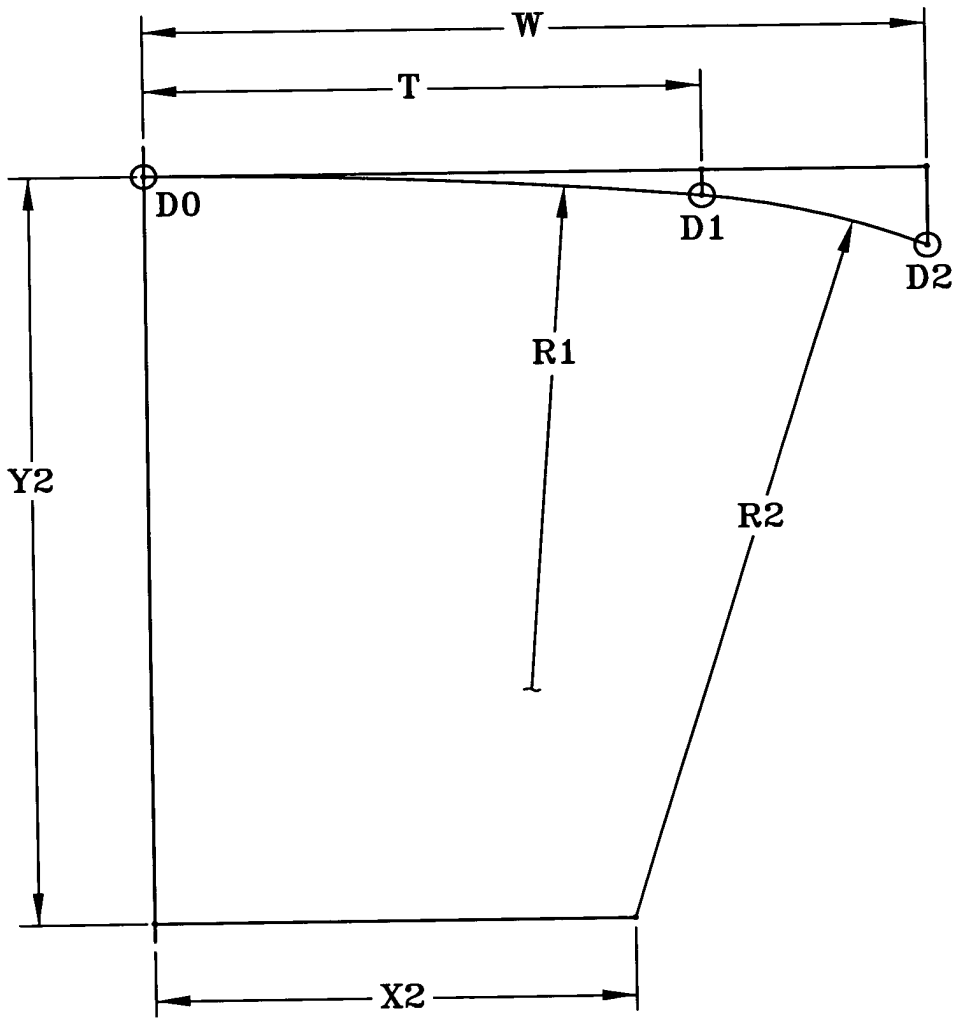


FIG-14

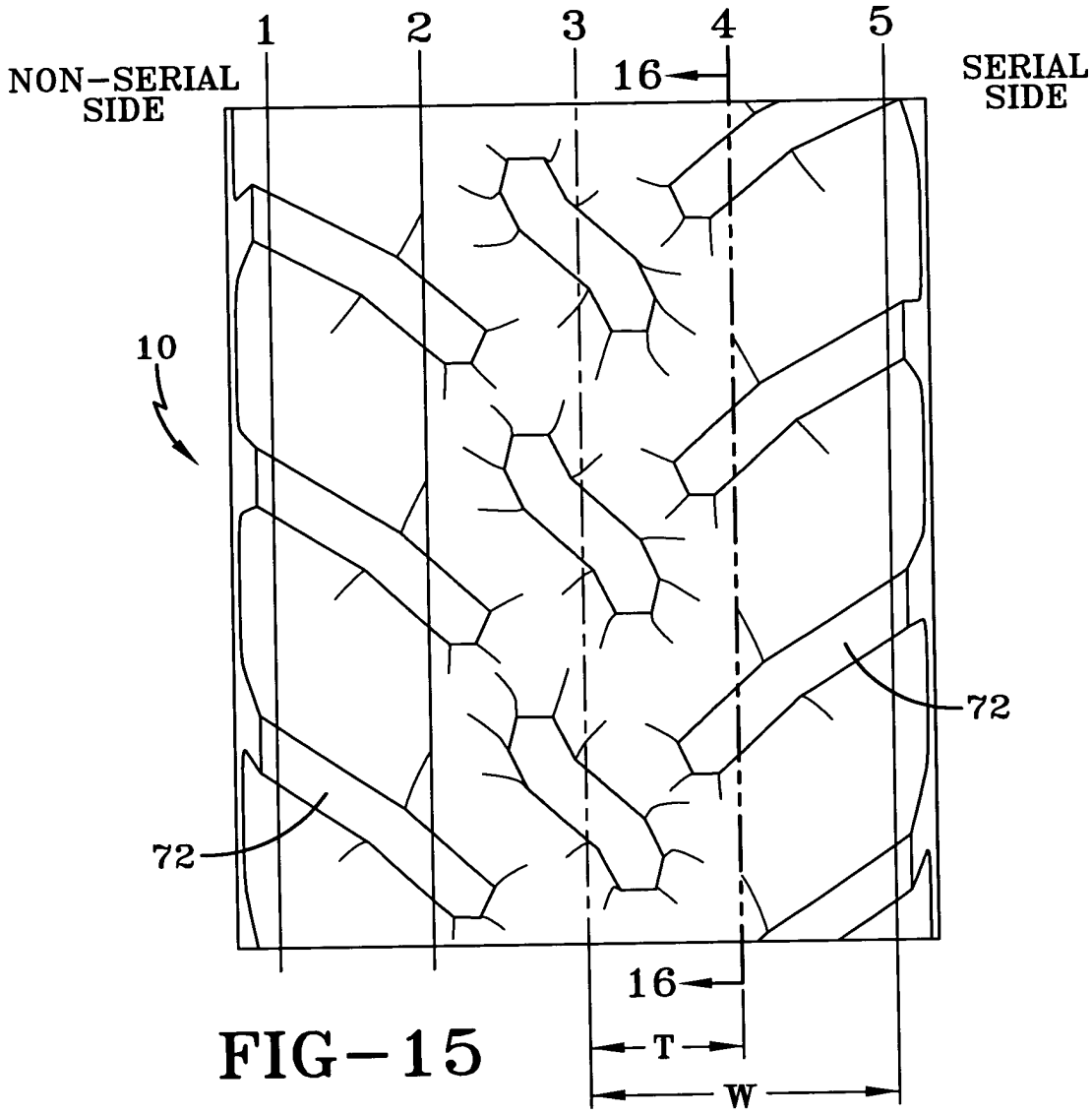


FIG-15

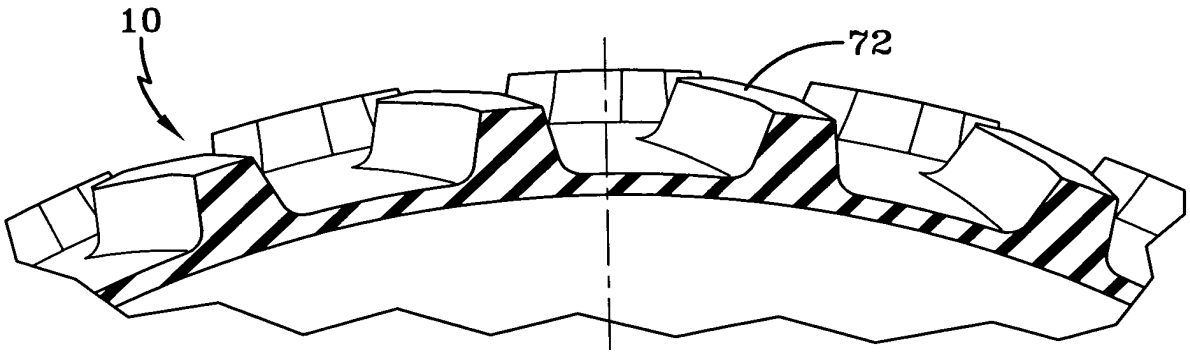


FIG-16

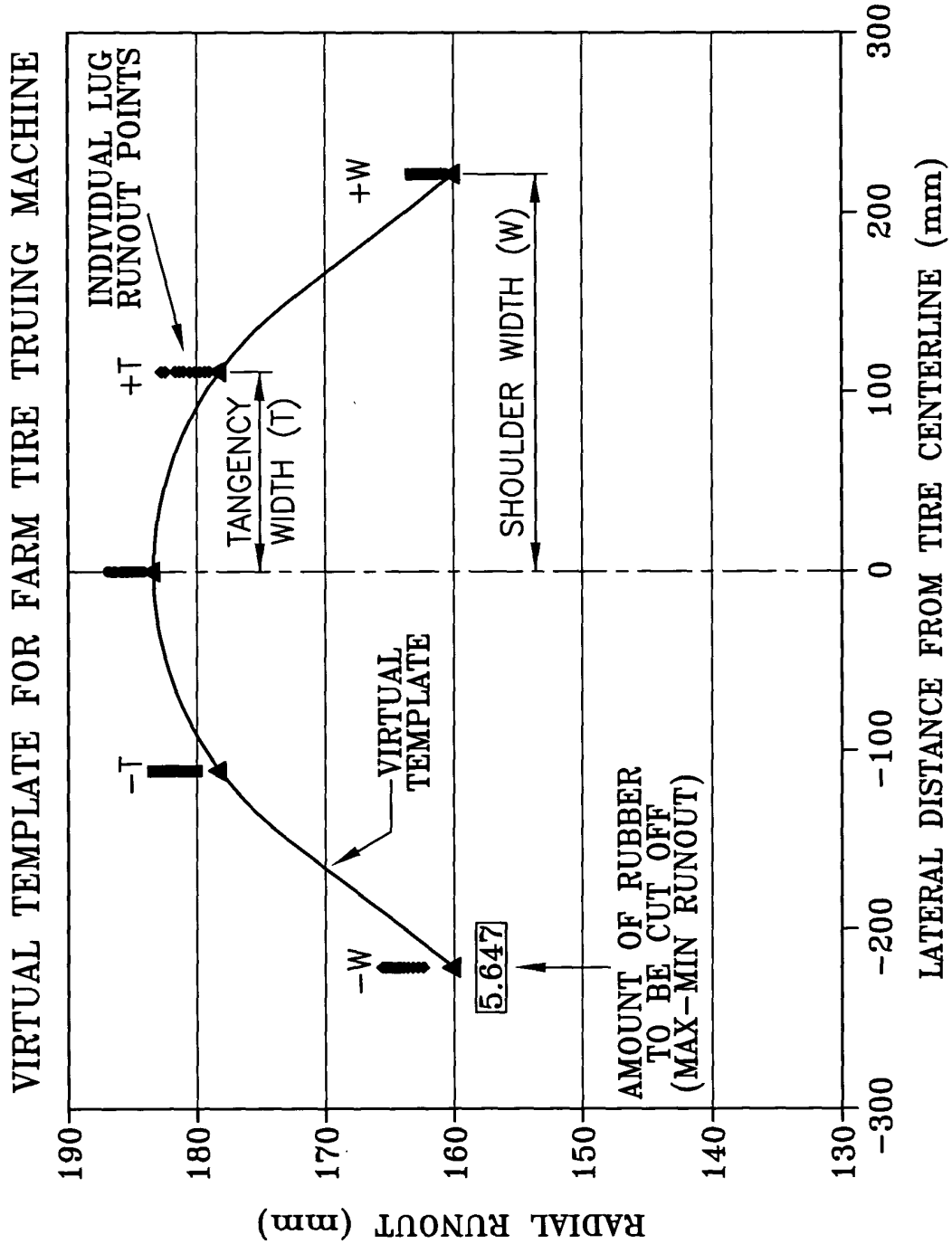

VIRTUAL TEMPLATE FOR FARM TIRE TRUING MACHINE
INDIVIDUAL LUG RUNOUT POINTS
+T
-T
+W
-W
TANGENCY WIDTH (T)
SHOULDER WIDTH (W)
VIRTUAL TEMPLATE
5.647
AMOUNT OF RUBBER TO BE CUT OFF (MAX-MIN RUNOUT)
RADIAL RUNOUT (mm)
190
180
170
160
150
140
130
-300
-200
-100
0
100
200
300
LATERAL DISTANCE FROM TIRE CENTERLINE (mm)

FIG-17

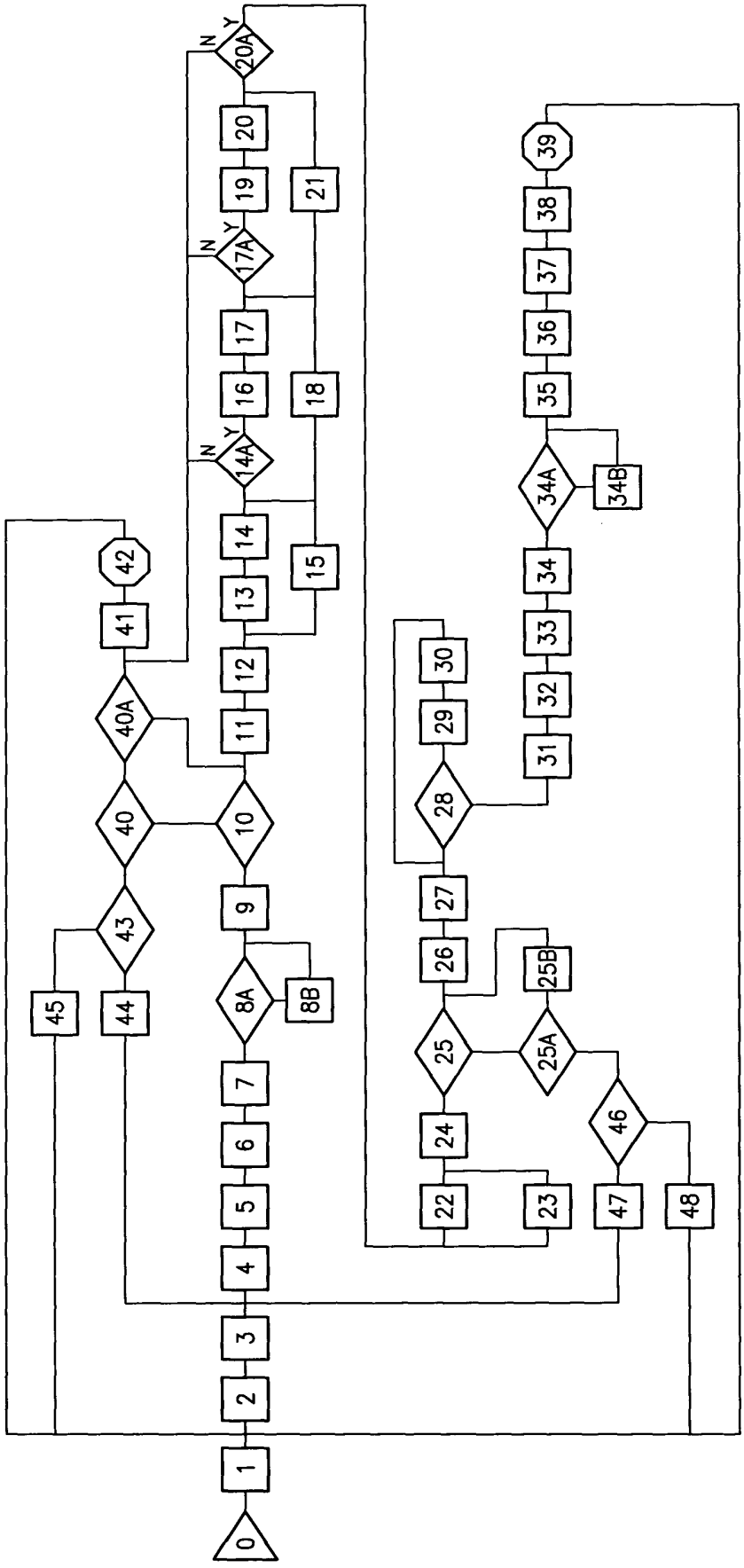

0
1
2
3
4
5
6
7
8A
8B
9
10
11
12
13
14
14A
15
16
17
17A
18
19
20
20A
21
22
23
24
25
25A
25B
26
27
28
29
30
31
32
33
34
34A
34B
35
36
37
38
39
40
40A
41
42
43
44
45
46
47
48
Y
N

FIG-18

0– START UP

1– HOME MACHINE ELEMENTS OPERATOR PRESS HOME AXES BUTTON.

2– LOCATE TIRE, RAISE ON LIFT, AND CHUCK TIRE.

3– ENTER PROCESS DATA INTO COMPUTER.

4– MOVE LASER TO MOLD SPLIT LINE, ADJUST W/VERNIER, PRESS BUTTON TO LOCK DOWN CARRIAGE.

5– ADJUST LASER Y–AXIS INTO POSITION FOR NEXT SIZE DIAMETER TIRE.

6– ROTATE TIRE SO LASER IS JUST BEFORE 1ST LUG AND RESET DRUM ENCODER TO 0–DEGREES.

7– PRESS TAKE RUNOUT MEASUREMENT PB, TIRE ROTATES AND MACHINE COLLECTS DATA.

8A– IS MOLD SPLIT AT CENTERLINE (NO/YES).

8B– MOVE CARRIAGE TO CORRECT POSITION.

9– DO THE FOLLOWING CALCULATIONS ON DATA

1) FIND THE # OF LUGS
2) LUG AVERAGING ROUTINE (1 VALUE/LUG)
3) FIND LOW LUG VALUE, HIGH LUG
4) MEASURE RUN–OUT AND VERIFY
5) FLAT SPOT CHECKING
6) RADIAL RUN–OUT TEST (5 HARMONICS)

10– IS TIRE A TRUING CANDIDATE?

11– TURN OFF CL LASER, UNLOCK/MOVE LASER TO <u>RIGHT–TANGENT</u> PT., PRESS BUTTON TO LOCK DOWN CARRIAGE.

12– PRESS TAKE RUNOUT MEASUREMENT PB, TIRE ROTATES AND MACHINE COLLECTS DATA.

FIG–19A

13– UNLOCK/MOVE LASER TO RIGHT–SHOULDER PT., PRESS BUTTON TO LOCK DOWN CARRIAGE.

14– PRESS TAKE RUNOUT MEASUREMENT PB, TIRE ROTATES AND MACHINE COLLECTS DATA.

14A– CONTINUE (NO/YES)

15– DO CALCULATIONS ON RIGHT–TANGENT DATA

1) FIND THE # OF LUGS
2) LUG AVERAGING ROUTINE (1 VALUE/LUG)
3) FIND LOW LUG VALUE
4) MEASURE RUN–OUT AND VERIFY
5) FLAT SPOT CHECKING

16– UNLOCK/MOVE LASER TO LEFT–TANGENT PT., PRESS BUTTON TO LOCK DOWN CARRIAGE.

17A– CONTINUE (NO/YES)

17– PRESS TAKE RUNOUT MEASUREMENT PB, TIRE ROTATES AND MACHINE COLLECTS DATA.

18– DO CALCULATIONS ON RIGHT–SHOULDER DATA

1) FIND THE # OF LUGS
2) LUG AVERAGING ROUTINE (1 VALUE/LUG)
3) FIND LOW LUG VALUE
4) MEASURE RUN–OUT AND VERIFY
5) FLAT SPOT CHECKING

19– UNLOCK/MOVE LASER TO LEFT–SHOULDER PT., PRESS BUTTON TO LOCK DOWN CARRIAGE.

20– PRESS TAKE RUNOUT MEASUREMENT PB, TIRE ROTATES AND MACHINE COLLECTS DATA.

20A– CONTINUE (NO/YES)

FIG–19B

21– DO CALCULATIONS ON LEFT–TANGENT DATA
- 1) FIND THE # OF LUGS
- 2) LUG AVERAGING ROUTINE (1 VALUE/LUG)
- 3) FIND LOW LUG VALUE
- 4) MEASURE RUN–OUT AND VERIFY
- 5) FLAT SPOT CHECKING

22– MOVE LASER BACK AND OUT TO HOME SAFE POSITION.

23– DO CALCULATIONS ON LEFT–SHOULDER DATA
- 1) FIND THE # OF LUGS
- 2) LUG AVERAGING ROUTINE (1 VALUE/LUG)
- 3) FIND LOW LUG VALUE
- 4) MEASURE RUN–OUT AND VERIFY
- 5) FLAT SPOT CHECKING

24– DO THE FOLLOWING CALCULATIONS
- 1) CREATE THE VIRTUAL TEMPLATE
- 2) CONICITY CHECK
- 3) FIND TIR

25– IS TIRE A CANDIDATE FOR TRUING? (NO/YES).

25A– OVERRIDE TO MAKE 2 CUTS (NO/YES).

25B– ADJUST VIRTUAL TEMPLATE.

26– MOVE THE TRUER CARRIAGE TO MOLD SPLIT LINE AND LOCK.

27– TRUER WILL MAKE FIRST PASS AND CUT TO VIRTUAL TEMPLATE.

28– WANT TO MAKE ANOTHER PASS? (NO/YES).

29– ENTER THE DEPTH OF THE FOLLOWING CUT AND PRESS BUTTON TO INITIALIZE CYCLE.

30– TRUER WILL MAKE PASS AND CUT TO ADJUSTED PROFILE.

FIG–19C

31– UNLOCK THE TRUER STAND AND MOVE IT BACK TO THE HOME POSITION.

32– MOVE LASER TO MOLD SPLIT LINE, ADJUST W/VERNIER, PRESS BUTTON TO LOCK DOWN CARRIAGE.

33– ADJUST LASER Y–AXIS INTO POSITION FOR NEXT SIZE DIAMETER TIRE.

34– PRESS BUTTON TO ASSIGN LASER HOME, RESET LASER ENCODER.

34A– IS MOLD SPLIT AT CENTERLINE.

34B– MOVE CARRIAGE TO CORRECT POSITION.

35– PRESS TAKE RUNOUT MEASUREMENT PB, TIRE ROTATES AND MACHINE COLLECTS DATA.

36– DO THE FOLLOWING CALCULATIONS ON DATA

1) FIND THE # OF LUGS
2) LUG AVERAGING ROUTINE (1 VALUE/LUG)
3) FIND LOW LUG VALUE, HIGH LUG
4) MEASURE RUN–OUT AND VERIFY
5) RADIAL RUN–OUT TEST (5 HARMONICS)

37– MOVE LASER BACK AND OUT TO HOME SAFE POSITION

38– PLACE PROPER MARKINGS ON THE TIRE THEN UN–CHUCK THE TIRE

39– MOVE THE TIRE TO THE PROPER LOCATION FOR DISTRIBUTION THEN CONTINUE

40– DOES THE TIRE PASS AND NOT NEED TRUING? (NO/YES)

40A– OVERRIDE FORCE TRUING ON A TIRE THAT PASSES WITHOUT TRUING? (NO/YES)

41– PLACE PROPER MARKINGS ON THE TIRE THEN UN–CHUCK THE TIRE

FIG–19D

42– MOVE THE TIRE TO THE PROPER LOCATION FOR DISTRIBUTION THEN CONTINUE

43– DO YOU WANT TO RE–CHUCK THE TIRE? (NO/YES)

44– MOVE LASER BACK TO THE HOME POSITION AND RE–CHUCK THE TIRE

45– DISCARD TIRE APPROPRIATELY AND LOCATE NEW TIRE

46– DO YOU WANT TO RE–CHUCK THE TIRE? (NO/YES)

47– MOVE LASER BACK TO THE HOME POSITION AND RE–CHUCK THE TIRE

48– DISCARD TIRE APPROPRIATELY AND LOCATE NEW TIRE

FIG–19E

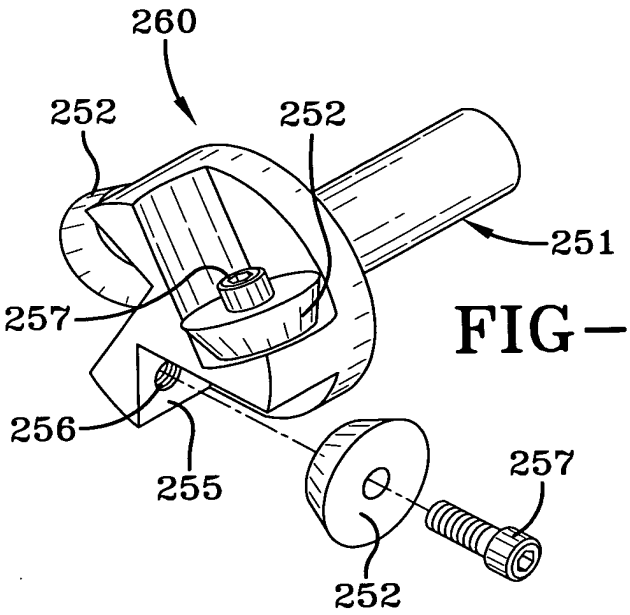


FIG-20

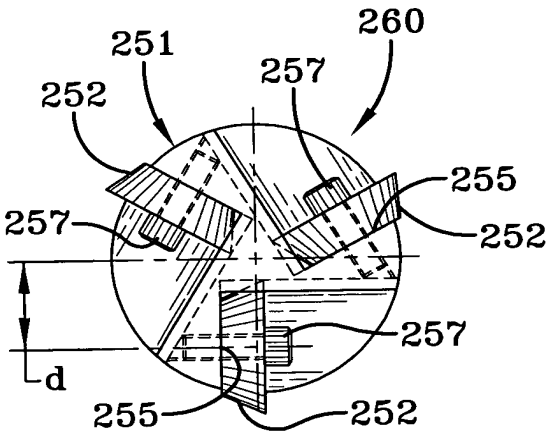


FIG-21

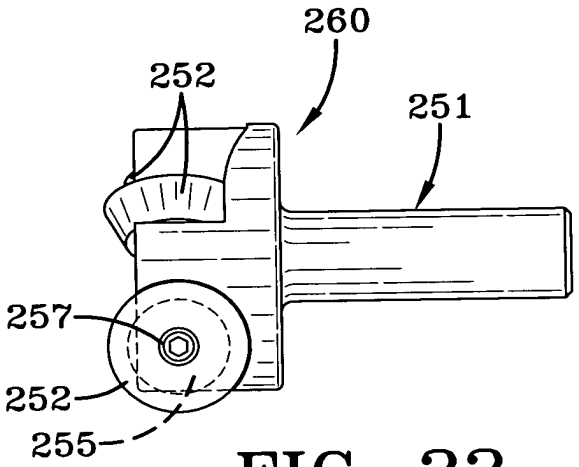


FIG-22